

Agricultural Bioterrorism

Dr. David Franz

Agricultural Bioterrorism

David R. Franz, DVM, Ph.D

Examples of diseases often mentioned in the context of biological warfare

Human diseases

Smallpox
Cholera
Shigellosis

Zoonoses

Anthrax
Brucellosis
Coccidioidomycosis
EEE / VEE / WEE
Ebola/Marburg
Histoplasmosis

Melioidosis
Glanders
Plague
Psittacosis
Q Fever
Tularemia

Animal diseases

African Swine Fever
Foot and Mouth
Fowl Plague
Newcastle
Rinderpest

Examples of diseases often mentioned in the context of biological warfare

Human diseases

Smallpox
Cholera
Shigellosis

Zoonoses

Anthrax
Brucellosis
Coccidioidomycosis
EEE / VEE / WEE
Ebola/Marburg
Histoplasmosis

Melioidosis
Glanders
Plague
Psittacosis
Q Fever
Tularemia

Animal diseases

African Swine Fever
Foot and Mouth
Fowl Plague
Newcastle
Rinderpest

**Zoonotics not
Highly Contagious**

Why did they pick the zoonotics ?

- Not highly contagious; therefore, controllable
- Many strains or isolates available in nature
- Relatively well understood; PH experience with
- Animal models for virulence testing
- Animal models for phenotypic manipulation
- Animals as production “vessels”
- Legitimate reason to work with the agents

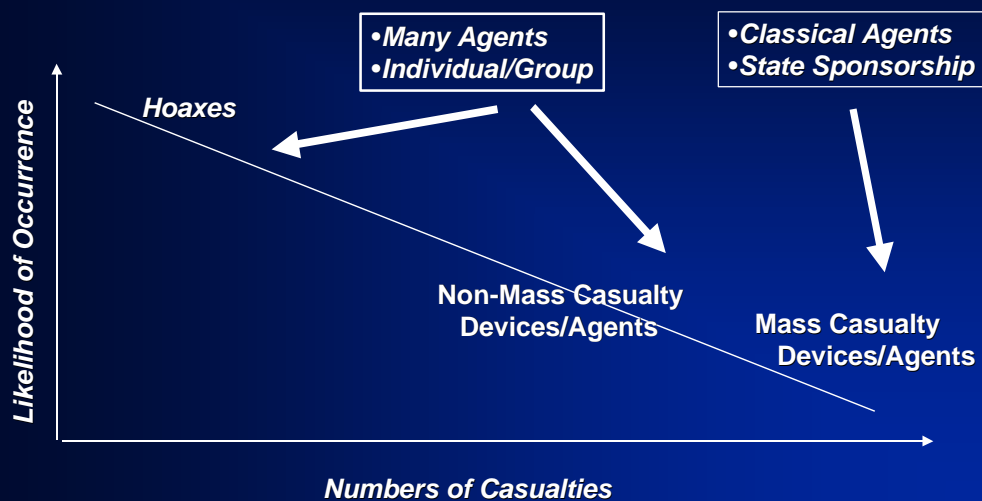
The Biological Threat has Changed

Cold War → Gulf War → Today... & Tomorrow?
Breakup of USSR

Tactical use on
the battlefield
....and strategic
use against the U.S.

“Terrorist” use against
the force, our cities...
and our livestock herds?

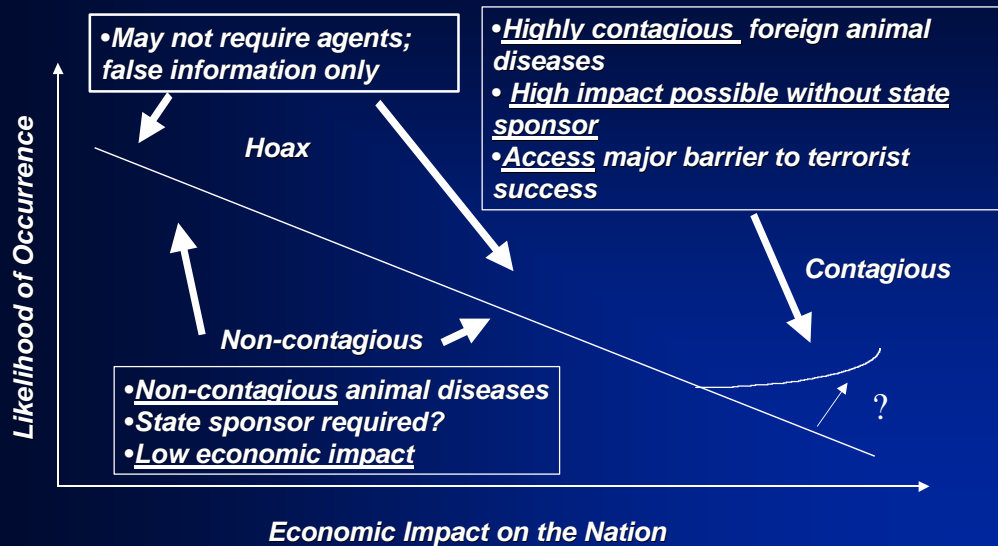
The Biological Terrorist Spectrum



Biological Terrorism FAD Agents

	Classical Agents vs. Humans	Foreign Animal Disease Agents
Intent	Can't Measure	Can't Measure
Access	From Environment	From Environment
R&D	Necessary & Difficult	<u>Not Necessary</u>
Scale up	Necessary & Difficult	<u>Not Necessary</u>
Production	Necessary & Difficult	<u>Not Necessary</u>
Weaponization	(Necessary & Difficult)	<u>Not Necessary</u>
Contagious	A few, but not highly	<u>Some Highly</u> ←

The FAD Terrorist Spectrum



Foreign Animal Disease Agents

Hog Cholera

Avian Flu

African Swine Fever

Foot and Mouth Disease

Rinderpest

Vesicular Stomatitis

Newcastle

Emerging Infectious Diseases in Livestock

“...previously unreported or previously regionally eradicated infectious diseases to which livestock populations are susceptible, cases or outbreaks of which may occur as a result of transfer of etiologic agent by animals, humans or fomites and which may simply have arisen or evolved as a result of environmental pressures and/or recombination.

Emerging Infectious Diseases in Livestock

“...previously unreported or previously regionally eradicated infectious diseases to which livestock populations are susceptible, cases or outbreaks of which may occur as a result of transfer of etiologic agent by animals, humans or fomites ~~and which may simply have arisen or evolved as a result of environmental pressures and/or recombination.~~”

...+ **INTENT** = ***TERRORISM***

Potential Economic Impact of Emerging Animal Disease ...or Agricultural Terrorism

- Multi-billion dollar industries
- Populations are concentrated
- Small outbreak -- Widespread impact
- Local --> National --> International
- Prosperous nations take food for granted
- Low-visibility politically

VEE - Colombia/Venezuela 1995

- 75,000-100,000 Human cases in 8 months
- Equid deaths unknown
- Response: Aerial Spraying and Immunization
- Vaccination program could have prevented

Insect-borne zoonotic

FMD - Taiwan 1997

- 6,000 farms affected in 3 months
- 1 M pigs diseased; 3.8 M destroyed
- Response: Cull and Slaughter
- Loss of Japanese export market
- Estimated loss: \$5M.....\$5B+

Highly-contagious non-zoonotic

Nipah in Malaysia 1997 - 1999

- Ca. 900K pigs culled June 99.....continued
- 265 human cases; 105 deaths
- Psychological impact on humans
- Enormous economic loss
- Response: Cull and slaughter
- Truly “an emerging agent”

Contagious zoonotic

Is it natural or manmade?

- Spontaneous epidemic in an endemic area
- Spontaneous epidemic of an unfamiliar or unknown disease
- Facility accident
- Biological Warfare or Terrorist attack
- Hoax

FAD Outbreak vs. Agricultural Terrorism

	Outbreak	Terrorism
Occurrence	Seasonal- Epi. Clues (Maybe)	Almost any time
Agent	Regional Threats (Maybe)	Many Possible
Population	Selective Immunity Familiarity	Likely Unprepared
Dynamics	Traditional Cycles of Transmission	Probably Very Similar
Warning	Sentinels Possible	Warning Unlikely

What agents should we worry about and plan for?

- Highly Contagious “Human” Viruses: Just need access
- **Foreign Animal Contagious Viruses: Just need access**
- Classical BW agents: Prepare and deliver with difficulty...or buy
- Hundreds of other agents: Most have weaknesses
- Genetically Engineered Agents: The Future???

Contagious >> Aerosol-Infective > Vector-Borne > Food and Water Borne

Foreign Animal Disease **(Setting Priorities)**

- Monitor disease patterns (regional and international)
- Know the threats and means of spread
- Educate clinicians, producers and leaders
- Monitor the health of our herds
- Teach and practice preventive medicine & security
- Diagnostics and--for some diseases--vaccines
- Plan ahead (federal, state, local and individual)
- Reference laboratories and strong tech base

Agricultural Counterterrorism

Dr. David Huxsoll



We must accept the reality that
we will not be able to prevent
every act of BW terrorism.

We can, however, learn to
minimize the damage.

Preparation for a Biological Attack May Lack Enthusiasm

- Overwhelming nature of the problem
- Planning for an event that has not occurred before

The Magnitude of the Problem

- No single terrorist incident to date has killed more than 400 persons
- In the 1980's the Rajneeshee contaminated salad bars with *Salmonella* to influence an election in Oregon
 - 751 known cases of gastrointestinal disease
 - Highly lethal agent may have caused many more than 400 deaths

Animals as Sentinels

- Many of the potential biological agents that might be used by terrorists are zoonotic disease agents, transmissible from animals to man
- Where human populations are the target of terrorists, coincidental infections in various species of animals may occur

Foreign Animal Diseases are a Likely Choice for Terrorists

- Easy to acquire
- Dissemination not difficult
- Readily transmissible
- Highly susceptible animal population

Countries Reporting Outbreaks of Foot and Mouth Disease 1996-1999

Americas	6
Africa	27
Asia	31
Europe	5
Former Soviet Union	6
TOTAL	75

Detection

- Conventional weapons
 - Metal detectors, x-ray machines, sniffing dogs, etc.
- Chemical Weapons
 - Detectors available
- BW agents
 - No reliable detection systems
 - Terrorists can strike almost any target they desire

Responses to a Biological Disaster

- Self-protection
- Detection, diagnosis, identification
- Decontamination and disinfection
- Prophylaxis and therapy

Responses to a Biological Disaster

- Dissemination of information
- Control of panic, chaos, rumors
- Safe water and food
- Control of insects and rodents
- Disposal of carcasses and corpses

Rapid Identification of the Agents is Vital

- Rapid ID can mitigate the effects
- Type of treatment and medical response
- Epidemiology
 - (transmission, vectors, reservoirs, etc.)
- Duration of illness
- Expected mortality
- Isolation or quarantine measures
- Means of corpse or carcass disposal

Identification of Biological Agents

- Federal laboratories
(e.g., USAMRIID, CDC, NVSL, FADDL)
- State and City Health Laboratories
- State Veterinary Diagnostic Labs



In collecting specimens for laboratory analysis, special attention must be given to preservation of the sample, protection of evidence and chain of custody.

Any act of biological terrorism will create panic, chaos, and crises throughout the country.

Results of terrorist attacks involving explosives or chemical agents are immediate and defined; the effects of biological attacks are usually delayed and difficult to define.

However, the delayed effects of a biological attack enhance the opportunity for a medical response.

Foreign Animal Diseases

- The Animal and Plant Health Inspection Service of the U.S. Department of Agriculture has the responsibility for maintaining a readiness to cope with outbreaks of exotic animal diseases
- The response to an outbreak resulting from a terrorist use of foreign animal diseases may be very similar to that in a natural outbreak
- It is likely that outbreaks resulting from a terrorist use of FAD may be overwhelming (e.g., multiple outbreaks, multiple agents)

Foreign Animal Diseases

- The Animal and Plant Health Inspection Service of the U.S. Department of Agriculture has the responsibility for maintaining a readiness to cope with outbreaks of exotic animal diseases
- The response to an outbreak resulting from a terrorist use of foreign animal diseases may be very similar to that in a natural outbreak
- It is likely that outbreaks resulting from a terrorist use of FAD may be overwhelming (e.g., multiple outbreaks, multiple agents)

CDC Report - April 21, 2000

- Primary care physicians, emergency room and other local health care providers must learn to recognize signs and symptoms of bioterrorism because they will probably be the first to see them.

Training in Foreign Animal Diseases

- Must be expanded
- Practicing veterinarians
- Veterinary diagnostic laboratory personnel
- Faculty in schools and colleges of veterinary medicine
- Professional veterinary medical students

Training at the Foreign Animal Disease Diagnostic Laboratory



Training at FADDL

- Formal 1-2 week courses on recognition and diagnosis of foreign animal diseases
- Individual bench training
- Veterinary student internships
- Foreign animal disease awareness courses

Research Requirements for Countering Bioterrorism

- Rapid and field deployable means of identification of agents
- Genomic mapping of biological agents
- Effective vaccines/chemoprophylactics/therapeutics

Programs Countering Bioterrorism Have a Positive Ripple Effect

- Enhancement of all medical and veterinary medical diagnostic laboratories
- The nation is better postured to address new and emerging diseases
- Benefits extend to food and water safety
- Environmental health

Integrating Veterinary & Public Health Surveillance: Montana Case Study

Dr. Marc Mattix

Emergency Preparedness and Response for Bioterrorism

A Proposal in Response to CDC Program Announcement 99051

The specter of bioterrorism has risen in our society to present a threat that can no longer be ignored. This threat presents new and daunting challenges to officials across a wide range of the public service sector. Proper response preparedness will require not only close communication and coordination among civil response and law enforcement officials, but also must necessarily include the formation of new partnerships and involvement with the public health and medical community.

Emergency responders traditionally are trained and experienced in dealing mainly with natural disasters (e.g., earthquakes, floods, fires, droughts, tornados) and certain technologic disasters (e.g., hazardous material spills, bomb blasts, chemical explosions); situations in which there exists a readily-apparent initiating event and an identifiable incident scene. Unlike explosions or chemical releases, a bioterrorist attack could be surreptitious; infecting people en masse without notice. Such an occurrence would not present as a hazmat-type incident for which today's civil defense workers are prepared to respond to. The incident would present first and foremost as a medical and public health emergency.

In the event of a covert terrorist release of a biological agent, the first responders will not be policemen, firemen and EMT's, but rather primary care providers in emergency rooms and walk-in clinics. The response to covert bioterrorist attack is unlikely to involve flashing red lights and sirens, but rather clinicians and nurses doing triage, and public health workers doing epidemiology, outbreak intervention and disease surveillance. Symptoms among victims might not occur until days or weeks after infection, and those presenting to physicians and clinics would not all be in the same place. A strong public health network would be needed to piece together early reports of disease, and to determine quickly what had happened. It will be the medical or public health worker who will likely sound the "first alarm" in the event of a bioterrorist incident.

Health workers should undertake to ensure that the alarm is sounded as soon as possible. Time is of the essence, especially in situations involving agents such as anthrax, in which

antibiotic treatment is efficacious only if given shortly after the onset of symptoms. How quickly an incident is detected, analyzed, understood and addressed will determine the effectiveness of the medical and public health response. Surveillance systems must adapt to the changing needs of society. Efforts should be directed toward improving our current surveillance system in order to more quickly detect a bioterrorist incident based on the appearance of disease symptoms.

Nationwide, communicable disease surveillance systems today are driven by reports that are primarily based on laboratory findings. Furthermore, the diseases that are traditionally reported are only those specifically designated as notifiable and appearing on an exclusive list maintained by a state health department. While most state health department regulations also call for the reporting of "any unusual illness or cluster of illness", clinicians are unaccustomed to reporting unusual illness, and generally opt to defer reporting (assuming they report at all) until after a specific diagnosis has been made. And a cluster of illness can not be expected to be recognized by clinicians since cases of disease during an outbreak may be widely separated geographically, and appear to an individual clinician to be an isolated or sporadic occurrence.

The U.S. Centers for Disease Control and Prevention has stated that effective surveillance and epidemiologic capacity are the foundation for health departments to detect, evaluate and respond to terrorist events. The rapid detection of acute or insidious terrorist attacks using biological agents will require effective linking of data from a variety of sources, and that an effective public health response will depend on the quality of communications among partners. Complementing the need for accurate and timely case reports is the need for expertise to analyze the information properly. Timely and accurate information and analysis must be coupled with effective and rapid dissemination of information of those who need to know.

Of the twenty-two U.S. states located west of the Mississippi River, only five are not included in Nunn-Lugar-Domenici legislation addressing the threat of bioterrorism. These five states are clustered contiguously in the north-central region of our country, and consist of Idaho, Montana, North Dakota, South Dakota and Wyoming. They collectively comprise almost fifteen percent of our country's land mass. Each state is similar in being characterized as rural and frontier.

The threat of bioterrorism extends even to rural, frontier states. While the states of Idaho, Montana, North Dakota, South Dakota and Wyoming are most certainly not a high priority target for foreign, state-sponsored terrorist, they are not, by any means, at "no-risk", or even necessarily at "low-risk" of incident. The remoteness of these states and their sparse population, which likely serve as a "turn-off " for international terrorists, seem to hold a certain appeal for domestic terrorist elements, e.g., unabombers, capitol shootists, Freeman, Aryans, survivalists, militiamen, skinheads, klansmen, skinheads, religious cult extremists, and anti-government radicals. It might serve well to remember that all of the major bioterrorist incidents recorded in the U.S. during contemporary times (ie., the Rajneeshi's and the Minnesota Patriots) were perpetrated not by foreign, state-sponsored terrorist, but by legal residents for political purposes. The bioterrorist threat to homeland America does not originate only from outside our nation, but also, and perhaps more importantly, from within.

The five states of Idaho, Montana, North Dakota, South Dakota and Wyoming jointly propose to develop and implement a regional strategem for strengthening local and state public health capacity to respond to bioterrorist threats by improving on existing capacity, and developing new capacity, for gathering and evaluating disease surveillance data. An important element of the plan will be the inclusion of animal disease data.

Animals have long served mankind as "canaries in the coal mine". The utility of animals as sentinels of human disease is well established. Many of the microorganisms available for use as weapons by terrorists are zoonotic disease agents. A wide range of wild and domestic animals are susceptible to infection with the agents in a bioterrorist arsenal. Some animals, in fact, are even more susceptible to infection with certain agents and would serve as an more sensitive and rapid indicator of a bioterrorist incident. Animals outnumber humans in the region by a very large margin, and can potentially be a very valuable source of disease intelligence, possibly even serving to function as an early warning system to signal the occurrence of an incident.

Animal health officials, epidemiologists and several medical officers from each of the above five states have expressed interest in undertaking to pioneer a model system of regional surveillance for incidents of unexplained critical illness in man and animals. The system would serve to function as an early-warning and detection system based on the appearance of disease symptoms, not laboratory findings. Such a system would serve

functionally as a **regional disease intelligence center**. If properly designed, it could serve as a model system for other rural, frontier states.

Maximum use would be made of modern communication technology to create an electronic repository of information from a network of human and animal health providers. Input to such a **regional disease intelligence center** would be provided by a wide variety of human and animal health care resources throughout the area including primary care physicians, practicing veterinarians, walk-in clinics, hospital emergency room staff, game wardens, EMS responders, poison control centers, humane societies, local and county public health departments, community health centers, medical examiners, animal shelters, county coroners, phone-in "ask-a-nurse" services, 911 dispatchers, etc. Communication tools to be used in such a system would include a custom-designed telephone answering and recording system; a specially-created, restricted-access web site for deposition of data; and a dedicated E-mail listserve group.

Complementing the need for timely and accurate case reports is the need for expertise to analyze the information properly. This capacity would be provided by each and every state involved in the project. An important feature of the system would be that all of the data in the system would be remotely and immediately available to authorized individuals from each of the five states. Authorized individuals would likely include state epidemiology staff, state animal health officials and state medical officers, and others as needed. Timely and accurate information analysis must then be coupled with effective and rapid dissemination of information to those who need to know.

**PROGRAM ANNOUNCEMENT 99051
PUBLIC HEALTH PREPAREDNESS AND RESPONSE FOR BIOTERRORISM**

Focus Area #2 - Surveillance and Epidemiologic Capacity

Executive Summary

The epidemiology staff of the state health agencies in Idaho, Montana, North Dakota, South Dakota and Wyoming jointly propose to conduct regional disease surveillance, and to collaboratively enhance epidemiologic capacity in response to the threat of bioterrorism. A major innovative feature of the proposal is surveillance for animal diseases, and integration of the data

into existing communicable disease surveillance infrastructure. To accomplish this, we propose to create a new, strong partnership with the veterinary medical community. We also propose to begin acquiring disease intelligence from other unconventional sources including poison control centers, 911 dispatchers, game wardens, animal shelters, medical examiners, coroners, phone-in Ask-a-nurse services, etc. The most significant feature of the proposal, however, is a plan to initiate surveillance based on the appearance of unexplained, acute illness and early-stage disease symptoms. This activity will increase the sensitivity of a surveillance system and improve its ability to rapidly detect not only a bioterrorist incident, but also naturally occurring disease outbreaks. To enhance epidemiologic capacity, we propose to form an alliance among epidemiology staff of the five state health agencies. Importantly, state veterinary officials involved in herd health will also be included in the alliance. This force of human and animal healthcare workers will be responsible for monitoring reports and analyzing findings resulting from the expanded surveillance activities. To facilitate information flow and safeguard security, maximum use will be made of modern communication technology. If properly designed and pioneered, the proposed initiative could serve as a model for use in other rural or frontier states.

Evaluation Criterion 1. Description of the Population and Jurisdiction Under Surveillance

The jurisdiction covered by the proposed activities includes the five U.S. states of Idaho, Montana, North Dakota, South Dakota and Wyoming. These states are clustered contiguously in the north-central region of our country. Together they comprise over 470,000 square miles and cover about 17% of the total land mass of the lower 48 states. The population count, density and distribution of these states are summarized in Table 1. It can be noted that all of the states are similar in being very rural. In each of the five states, fewer than half of the counties exceed a population density of six persons per square mile, causing all of them by federal definition to be a frontier state. Typical of frontier states, many residents live in medically-underserved communities. Each of the five states are fairly homogenous with respect to minority populations. The largest minority population in the region is the Native American and Hispanic.

Table 1. Population Characteristics; Idaho, Montana, South Dakota, North Dakota & Wyoming

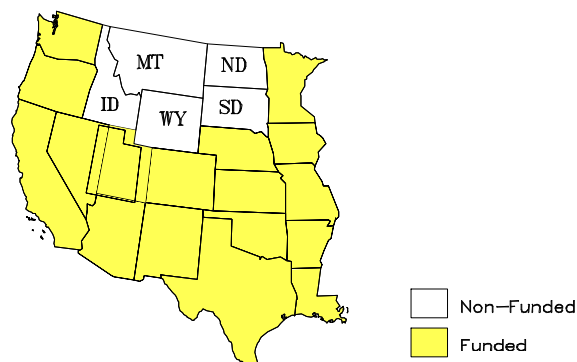
State	Population (1990 Census)	Land Area (Sq. Miles)	Pop Density (Pop/Sq. Mi.)	Rural Pop (Percent)	Minority Pop (Percent)
Idaho	1,006,749	82,751	12.2	69.0	3.3
Montana	799,065	145,556	5.5	76.4	7.4
North Dakota	638,800	68,994	9.3	57.6	5.8
South Dakota	696,004	75,896	9.2	66.9	9.8
Wyoming	453,588	97,104	4.7	70.4	4.1
Total	3,594,206	470,301	7.6	68.4	5.3

Animals in this five state region greatly outnumber humans. In Montana and Wyoming, registered cattle alone outnumber people by greater than a 3:1 margin. When other domestic animals such as horses, sheep, swine, cats and dogs are included in the count, the margin becomes much greater. If one adds to this the vast array of wild animal species, the vertebrate biomass attributable to humans in the region becomes dwarfed by animals.

There exists only five U.S. states west of the Mississippi River that are not included in Nunn-Lugar-Domenici legislation addressing the threat of bioterrorism (Figure 1). These five states are Idaho, Montana, North Dakota, South Dakota and Wyoming: the very states proposing herein to jointly enhance surveillance and epidemiologic capacity under CDC Program Announcement 99051, Public Health Preparedness and Response for Bioterrorism.

Evaluation Criterion 2. Description of Existing Public Health Capacity to Respond to Bioterrorism

Each of the five states are legislatively mandated to conduct surveillance for the prevention and control of communicable diseases. The various diseases and conditions required to be reported are specified in administrative rules of the individual state. The official list of notifiable diseases and conditions for each state appears in Appendix I. The priority disease threats of anthrax, plague, tularemia, botulism, brucellosis and Q-fever are reportable conditions in each of the five states.



**Figure 1. Distribution of Nunn-Lugar-Domenici Funds
Among States in the Western U.S.**

Summary descriptions of each state's existing public health capacity to respond to bioterrorism threats are presented in Appendix II. Described therein are current surveillance and response activities in each state, along with a description of interactions and relations between each state and their local public health agencies. The summaries also provide information on existing staffing, management, financial support, material and equipment investment, training, space, and previous collaborative relationships with health care partners.

Evaluation Criterion 3. Identification of Areas of Need

Officials in the states of Idaho, Montana, North Dakota, South Dakota and Wyoming have identified the following needs with respect to surveillance and epidemiologic capacity: 1) greater awareness of the threat of bioterrorism and the role of epidemiology, 2) higher-sensitivity surveillance techniques, 3) alliance with the veterinary medical community, 4) new and unconventional partnerships, 5) modern communication technology for rapid receipt and dissemination of disease intelligence, and 6) enhanced capacity for epidemiologic analysis of disease data.

Need #1 - Greater Awareness of the Threat of Bioterrorism, and

the Role of Epidemiology

Effective surveillance for bioterrorism will be difficult without an awareness of the threat among those who would be expected to report suspect incidents. A requisite for surveillance is recognition of the need for it. Persons unaware of the threat and its seriousness would not be motivated to respond to the threat. There exists a need to heighten the level of awareness among appropriate groups of people such as health care providers, veterinarians, civil defense workers, law enforcement officers and emergency responders. The degree to which such individuals are alert to the threat of bioterrorism will determine the effectiveness of surveillance activities.

The threat of bioterrorism extends even to rural, frontier states. While the states of Idaho, Montana, North Dakota, South Dakota and Wyoming are certainly not likely to be high priority targets for foreign, state-sponsored terrorists (although we are home to the majority of our nations land-based nuclear missile launch sites), we are not, by any means, at no-risk, or even at low-risk of incident (Table 2). The remoteness of our states and their sparse population seem to hold an appeal for domestic terrorist elements such as unabombers, freemen, capitol shootists, local militias, survivalists, aryan, skinheads, the klan and other white supremacist groups, religious cultists, animal rightists, ecoterrorists, antivivisectionists, right-wing extremists and anti-government radicals. It might serve well to remember that all of the major bioterrorist incidents recorded in the U.S. during contemporary times (ie., the Rajneeshi's and the Minnesota Patriots) were perpetrated not by foreign, state-sponsored terrorists, but by legal residents for political purposes. The bioterrorist threat to homeland America does not originate only from outside our nation, but also, and perhaps more importantly, from within. It is critical that persons-at-need recognize and appreciate the depth and breadth of the bioterrorist threat.

**Table 2. Examples of Terrorist Incidents & Threats
in the Region: Past and Present**

Ruby Ridge Theodore Kaczynski Eugene Russell Weston Freemen Aryan Nation Ku Klux Klan
--

Phineas Priesthood Posse Comitatus

There is little experience in the U.S. responding to incidents involving biologic weapons of mass destruction. It is unlikely that a bioterrorist incident will unfold like the disaster and emergency situation civil response workers are accustomed to. Emergency responders traditionally are trained and experienced in dealing mainly with natural disasters (e.g., earthquakes, floods, fires, droughts, tornados) and certain technologic disasters (e.g., hazardous material spills, bomb blasts, chemical explosions); situations in which there exists a readily-apparent initiating event and an identifiable incident scene. Unlike explosions or chemical releases, a bioterrorist attack could be surreptitious; infecting people *en masse* without notice. Such an occurrence would not present as a hazmat-type incident for which today=s civil defense workers are prepared to respond to. The incident would present first and foremost as a medical and public health emergency.

In the event of a covert terrorist release of a biological agent, the first responders will not be policemen, firemen and EMT=s, but rather primary care providers in emergency rooms and walk-in clinics. The response to covert bioterrorist attack is unlikely to involve flashing red lights and sirens, but rather clinicians and nurses doing triage, and public health workers doing epidemiology, outbreak intervention and disease surveillance. Symptoms among victims might not occur until days or weeks after infection, and those presenting to physicians and clinics would not all be in the same place.

A strong public health network is needed to piece together early reports of disease, and to determine quickly what had happened. It will be the physician, veterinarian or epidemiologist who will most likely sound the alarm in the event of a bioterrorist incident. The response would likely begin with a medical and epidemiological investigation to determine the causative agent, source of infection, mode of transmission, measures for control, populations at risk, etc. Law enforcement and civil defense will be looking to the health and medical community for answers to many questions. There is a need for the epidemiology profession to secure a seat at the planning table, and to assume the leadership role that will be expected of them in the event of a bioterrorist incident.

Need #2 - Higher-Sensitivity Surveillance Techniques

Since medical, veterinary or public health workers will likely sound the first alarm in the event of a bioterrorist incident, these workers should undertake to ensure that the alarm is sounded as soon as possible. Time is of the essence, especially in situations involving agents such as anthrax, in which antibiotic treatment is efficacious only if given shortly after the onset of symptoms. How quickly an incident is detected, analyzed, understood and addressed will determine the effectiveness of the medical and public health response. Surveillance systems must adapt to the changing needs of society. Improvements need to be made in surveillance systems in order to more quickly detect not only bioterrorist incidents, but also cases and clusters of illness due to naturally-occurring disease or emerging, new pathogens.

Bioterrorist incidents are expected to be extremely uncommon occurrences. When undertaking surveillance for rare events, the premium should be placed on sensitivity,....not specificity. This becomes particularly important when dealing with high-impact events such as the release of biological or chemical weapons of mass destruction; the consequences of missing a true positive report in the event of an actual incident are much more serious than receiving false positive reports in the absence of an actual incident. The early identification of low-probability/high-consequence events calls for surveillance mechanisms which maximize sensitivity.

The sensitivity of surveillance for emerging new pathogen or bioterrorist incidents can be improved by undertaking surveillance based on the appearance of disease symptoms. Many new infectious diseases identified in the U.S. during the last several decades were recognized through investigations of illness for which no cause had been determined. Surveillance for incidents of unexplained, acute illness due to possibly infectious causes may make possible the earlier recognition of new infectious agents occurring either naturally or unnaturally.

Nationwide, communicable disease surveillance systems are driven primarily by reports that are based on laboratory findings. The diseases reported are traditionally those specifically designated by the state as notifiable. While most state health department rules/regulations also call for the reporting of any unusual illness or cluster of illness, clinicians are unaccustomed to reporting unusual illness, and generally opt to defer reporting

(assuming they report at all) until after a specific diagnosis has been made....and a cluster of illness cannot always be expected to be recognized by clinicians since cases of disease during an outbreak may be widely separated geographically, and appear to an individual clinician to be sporadic or isolated occurrences. The addition of surveillance measures based on disease symptoms to existing infrastructure would begin changes needed to bring public health surveillance into the 21st century.

Need #3 - Alliance with the Veterinary Medical community.

It is essential to avoid creating an arbitrarily narrow premise in the strategic planning process for bioterrorism preparedness. A working definition of bioterrorism is the use of biological agents to intentionally produce disease in **susceptible populations**. No distinction is made between subsets of susceptible populations. Domestic and wild animals, or even cultivated plants, are potential targets of the bioterrorist.

Modern biological warfare was first directed against livestock. Agents of the Central Powers disseminated the causative organism of glanders, *Burkholderia mallei*, throughout stables of horses mules during World War I, in order to paralyze troop and munitions mobility. The Japanese effectively directed the same agent against both horses and troops in World War II.

Animals could be a compelling target of bioterrorism. They could serve to provide a test population on which to conduct a dry run before targeting a human population. Alternatively, a terrorist may consider a biological attack on animals to be a safer venture than humans, and simply direct their attack on a population of animals to further their own particular goals. The agricultural industry is notoriously fragile; a terrorist attack using a contagious foreign animal disease could conceivably devastate the industry and regional economy. In this age of militant animal activists, an assault on our agricultural base is unfortunately a valid concern. Also, with high-profile, emotionally-charged, contentious issues such as the management of brucellosis in the Yellowstone National Park bison herd, a bioterrorist attack with an agent such as *Brucella abortus* is not inconceivable.

Animals have long served mankind as canaries in the coal mine. The utility of animals as sentinels of human disease is well

established. Most bioterrorist weapons are zoonotic disease agents. A wide range of wild and domestic animals are susceptible to infection with these agents. The incubation period of several agents is sometimes accelerated in animals. Some animals, in fact, are even more susceptible to infection with these agents, and would serve as an more sensitive and rapid indicator of a bioterrorist incident. Animals outnumber humans in the region by a very large margin, and can potentially be a very valuable source of disease intelligence, possibly even serving to function as an early warning system to signal the occurrence of an incident.

The recent outbreak of Hendra-like Virus among pigs in S.E. Asia resulting in 111 human deaths illustrates the need for strengthening partnerships with the veterinary medical community. A surveillance system for bioterrorist incidents could be enhanced by concomitant monitoring of unexplained diseases in animals due to possibly infectious causes. The coordination of veterinary and human health surveillance activities would serve to strengthen to epidemiologic capacity to respond to threats posed by, both, zoonotic diseases and bioterrorism.

Need #6 - New and Unconventional Partnerships

The specter of bioterrorism presents new and daunting challenges to officials across a wide range of the public service sector. Proper response preparedness will require not only close communication and coordination among the public health, medical and veterinary communities, but also must necessarily include the formation of new partnerships and involvement with law enforcement, civil defense and military officials.

Evaluation Criterion 5. Operational Plan - Description of First Year Activities

The five states of Idaho, Montana, North Dakota, South Dakota and Wyoming propose to conduct regional surveillance for incidents of unexplained acute illness in man and animals. This activity would augment current surveillance mechanisms and gradually be integrated into the existing infrastructure of each state health department. The system would be designed to provide early-warning and detection of disease outbreaks based on the appearance of certain disease syndromes. If properly designed and pioneered, it could serve as a model system for other rural, frontier states.

*Why **regional** surveillance?*

1.) Pathogenic microbes neither recognize state boundaries nor respect health jurisdictions.

2.) In surveillance, (like fishing), larger nets produce greater catches.

3.) The 5 states all share similar demographic, cultural and environmental characteristics.

4.) The 5 states are all without Nunn-Lugar-Domenici funds

5.) Combining efforts in response to limited resources can mutually benefit collaborating states

6.) Health workers in the region have a close collegial relationship and a history of successfully working well together.

A diagram of the operational plan appears in Figure 2. As shown in this diagram, we are proposing to establish a regional network of providers of unconventional disease data to supplement traditional surveillance activities. Sources of such data include veterinarians, animal clinics, poison control centers, game wardens, medical examiners, coroners, phone-in ask-a-nurse services and 911 dispatchers. Workers from these sources would be encouraged to make notice of incidents of unexplained acute illness among man and animals due to possibly infectious causes, and to report such incidents using a custom-designed, 24-hour, toll-free, region-wide telephone reporting system.

Reporting of incidents via the regional phone line would be voluntary. This would obviate the need to initiate lengthy and often uncertain attempts at official changes of rules or regulations governing disease reporting in the state. The decision to make reporting voluntary is not anticipated to negatively impact the outcome of the initiative. It is the experience of state epidemiologists that disease reporters are not motivated by force of law, but rather by information, education and understanding. Thus, an important element of the proposal, and one that is essential to the success of the initiative, would be for state officials in the region to fully and appropriately inform prospective reporters of the need for and importance of their involvement in this surveillance activity.

The technical capability to collect telephone reports and to provide immediate, remote access to the information already exists, and can be acquired through the Montana Department of Administration, Division of Information Services. Professionals in this agency would assist us in system design and development, and also be responsible for technical maintenance of the system when operational. The phone number 1-800-DISEASE is available for our choosing.

The 1-800-DISEASE telephone line is **NOT** proposed to function as an emergency hotline. It is proposed to serve merely as a data-gathering device and epidemiologic tool: a mechanism for acquiring information in order to identify communicable disease problems before they become manifest to the general public as an emergency. It must be realized that a disaster and emergency situation, as we know it, will not develop until days or weeks after an incident, and that it will likely unfold insidiously. The critical time to get phone calls coming through 1-800-DISEASE is before any problems are apparent: for when the brunt of an incident comes to bear, the time period for early detection will have passed. The purpose for the proposed phone line is not to receive emergency call, but rather to acquire data to determine if emergency calls should be initiated.

Callers to 1-800-DISEASE would always have the option of speaking to a live person. Such a person could be provided by the Montana Department of Military Affairs, Division of Disaster and Emergency Services; they have trained, emergency response duty officers manning their phone around-the-clock. In the event of an emergency call requiring immediate attention by a state or local health department, the duty officer would notify appropriate officials in the state of origin of the call, as specified by a call-down list that would be provided to the duty officer beforehand by each participating state. Since bioterrorist incidents and large communicable disease outbreaks are expected to be uncommon occurrences, emergency calls to the phone line should be rare. Most calls would be to report an individual incident of unexplained acute illness. These calls would need to be monitored on a regular basis and analyzed for evidence of a larger problem. It would be up to each state and their surveillance staff, epidemiologists, medical officers, and animal health workers to continually monitor calls to see if the individual reports can be pieced-together into some bigger picture. Since most call into the system would be expected to be reports of individual incidents of a non-emergent nature, and for which immediate attention and rapid follow up by state or local officials is not necessary, callers would have the option of filing a voice-recorded report. So long as such reports would be accessed regularly and in a timely fashion, this method of information capture could suitably serve the designed purpose of the system.

We propose to sustain these surveillance activities using current level staffing. It would be difficult to justify a full-time position responsible specifically and solely for bioterrorism

surveillance. We propose to integrate these activities into current surveillance infrastructure, and for the duties to be accomplished using existing resources.

Enhanced epidemiologic capacity would be achieved by joining forces with human and animal health officials in each of the five states in the region. We propose to create an alliance of state epidemiology staff, state veterinary officials, state medical officers, and others as needed. This taskforce would have immediate and remote access to incident reports received via 1-800-DISEASE, and they would be responsible for ensuring that reports are monitored on a regular basis. The regional taskforce would collectively provide the expertise needed to epidemiologically analyze the information. Individual states would be responsible for follow up and disposition of phone calls originating from within their jurisdiction.

- Network of information providers
- Unconventional sources of disease data
- Supplements traditional surveillance
- Identify incidents of unexplained illness among man and animals
- Telephone reporting system
 - 24-hour, toll-free, region-wide
 - Voice message recording capability
 - Live person option for emergencies
 - Joining of forces to enhance epi capacity
 - Alliance of animal and human health workers
 - Officials in 5 states to monitor reports
 - Remote, immediate access to incident reports
 - Individual states responsible for follow up and disposition of phone calls originating from within their jurisdiction
- Secure, restricted-access, internet web site
- Web site to house disease intelligence database
- Access limited to authorized state workers
- Database to contain record of phone reports
- Database to also contain follow up findings
- Database input only by state officials
- CDC to be asked to assist in database design
- Daily analysis of data by regional epi taskforce

Overview of Proposed Activities

1. Develop a multimedia presentation addressing the threat of bioterrorism in frontier America; deliver to groups of workers who

have a need-to-know

- to be developed collaboratively by workers in each state
- will serve need to inform, to educate & to raise level of awareness
- intent is to help build needed, new partnerships.

2. Establish a network of information providers; include new and unconventional sources of disease surveillance data

- examples include veterinarians, game wardens, poison control centers, humane societies, phone-in ask-a-nurse services, 911 dispatchers, EMS responders, medical examiners, coroners, emergency rooms, walk-in clinics, animal shelters, etc.

3. Set up a region-wide, toll-free, 24-hour phone line to report incidents of unexplained acute illness in man and animals

- integrate this surveillance activity into existing public health infrastructure

4. Organize a multidisciplinary workforce consisting of human health and animal health officials from each state; to be responsible for the daily monitoring and epidemiologic analysis of incident reports

- workers in each state to have immediate and remote access to incident reports
- each state responsible for follow up of incident reports originating from their jurisdiction
- identify situations requiring immediate response actions; individual states responsible for action

5. Put together an e-mail listserve to facilitate communication among workforce members

- each state to determine who they want included on the list from their state

6. Establish a secure, restricted-access web site on the internet so that confidential data files can be easily and safely shared among workforce members

- to provide multi-user capacity for long-distance data entry and retrieval

7. Create a database containing a record of incident reports, critical information and follow up findings

- place file on web site, making it unavailable to general public or unauthorized individuals
- data to be entered only by state government officials, ie., workforce members
- each state responsible for input of data on reports originating from their jurisdiction
- epidemiologic information contained in database to serve as

regional disease intelligence

8. Request that CDC assign an EIS officer to assist in the database design and development.

-CDC is a vital partner in a state's response to the threat of bioterrorism

-to help assure federal objectives are addressed

9. Develop a detailed plan for monitoring the implementation of the proposed activities and for evaluating the extent to which they strengthen local and national surveillance and epidemiologic capacity to respond to the threat of bioterrorism

Integrating Veterinary and Human Health Surveillance

Montana Case Study

Marc E. Mattix, DVM
Diplomate, ACVP

Emerging diseases

- **Emerging Infections: Microbial Threats to Health in the U.S.** Institute of Medicine (1994)

“...new, reemerging, or drug-resistant infections whose geographic range or incidence in humans has increased within the past two decades or whose incidence threatens to increase in the near future.”

- A new disease or a new manifestation of an old disease

CDC's response

- Enhanced surveillance and outbreak response
- Renewed support of basic and applied research
- Strengthen public health infrastructure
- Training and information programs

State and local initiatives

- Rebuild public health infrastructure
- Increase reporting and surveillance capacity
- Dual use
- New partnerships
- Public / Professional awareness

Accelerating emergence Factors

- Reduced public health influence
- Rampant urbanization
- Ecological manipulation
- Global transportation
- Popularity of exotic species
- Expansion of human, reservoir and vector populations
- Changing human susceptibility
- Microbial adaptation

Complacency

- "One can think of the middle of the 20th century as the end of one of the most important social revolutions in history:

...the virtual elimination of the infectious disease as a significant factor in social life."

Sir McFarland Burnet, 1962

Montana's Public Health Response to Domestic Bioterrorism


The Montana Plan

- Interagency communication
- Interdisciplinary communication
- Regional cooperation
- Nontraditional partnerships
- Dual-use

Bioterrorism

- **Definition:** Use of biological agents to intentionally produce disease or intoxication *susceptible populations* to meet terrorist goals
 - Agents: Most are zoonotic
 - Targets: Human and/or animal populations

The terrorist mindset

- Human behavior is purposeful
 - Terrorists are not crazy
 - Agents of Political Change- permission by behavior
 - Political activism
 - Political radicalism
 - Political terrorism- asymmetrical means
 - Low-intensity conflict
 - Conventional warfare
 - Terrorists need a response
- 

Montana?

- the Frontier Mystique
- the Unibomber
- Antigovernment radicals
- Religious cults
- Extremist groups
- Millenium/doomsday cults
- Psychopaths (*Eugene Russell Weston*)
- Antivivisectionists
- Animal rights activists

Infectious disease and public health

- Anthroponotic vs. Zoonotic disease
- Behavior vs. Mother Nature
- Mother Nature vs. Deliberate

Media relations

- Of primary importance when public health or economic interests are threatened
- Success depends on **public good will**
- OBSTACLES:
 - Media frenzy
 - Anti-establishment mood
- GOALS:
 - Inspire public trust and confidence
 - Timely and factual public information
 - Retail vs Wholesale communication

...the nature of a biologic attack

- Silent
- No “point-source event”
- Delayed onset of effect
 - Incubation time
 - Biological response time: SEB
- Interdiction next to impossible
- Detection next to impossible
- Diagnosis takes time
- *First hint of an attack?*

...the nature of a biologic attack

- An unnatural epidemic of an
***EMERGING INFECTIOUS
DISEASE***

...challenges in recognizing a bioterrorist attack

- Delayed onset
- Wide dissemination of cases
- Rarity of the natural disease
- Inadequate passive surveillance
- Communication inadequacies
- Sample recognition and collection
- Diagnostic inadequacies

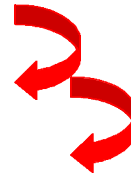
...health care challenges

- Inadequate resources
- Inadequate facilities
- Insufficient therapeutic/preventative stockpiles
- Bioprotection of health care workers
- Panic among the exposed, ill and health care providers
- Sociogenic illness

10 dead

100 affected

1,000 psychosomatic



...playing Clue

- Abnormal incidence of an infectious disease
- Large point-source outbreak
- Simultaneous infectious disease outbreaks
- Abnormal location of an infectious disease
- Animal mortality
- Severe disease in “bullet proof” individuals

Biological Warfare Agents

- Anthrax*
- Smallpox
- Plague*
- Brucellosis*
- Botulism*
- SEB*
- Tularemia*
- Q Fever*
- *Salmonella**
- Cholera
- Equine Encephalitis Virus
- Hemorrhagic Fever viruses

...agricultural bioterrorism

- Biological attack on state/ nation's agricultural industry
- Economically devastating
- Added benefit of zoonosis
- Well within the realm of “environmental terrorists”
- Fallout of human attack?

...foot and mouth disease

- DEFN: Acute, highly contagious viral disease of cloven-hoof animals
- Taiwan, 1927
- California, 1929
- Taiwan, 1997
 - Point source
 - Rapid dissemination
 - >5 million pigs killed

...the New Zealand experience

- August 1997
- Organized, deliberate, illegal introduction of a foreign biological agent against an organized government prevention program
- The Proliferators: NZ farmers

Preparedness

- National
 - Department of Defense
 - FBI and FEMA
 - Office of Emergency Preparedness
 - CDC Atlanta
- State & Local
 - Cooperative between law enforcement, first responder, and human/veterinary health communities
- Civilian Biodefense Program
 - Johns Hopkins grass roots effort

Local preparedness

- First Responders
 - Fire Department
 - Disaster and Emergency Services (DES)
 - HAZMAT units
- Veterinary/human health care officials
- State and local law enforcement
- FBI, FEMA, CDC, and EPA
- USAMRIID

Counterthreat

- Education
- Nontraditional partnerships
- Communication
- Surveillance and reporting
- R&D for biologics and antibiotics
- Rapid diagnostics

Local preparedness

- **EARLY DETECTION & EARLY RESPONSE**
- *ABSOLUTELY depends on ROUTINE local and informal interaction between the “Greater Integrated Public Health Community”*

“Non-traditional Partnerships”



DAKOTA-IDAHO-MONTANA BT SURVEILLANCE TASKFORCE

Montana's Public Health Response to Domestic Bioterrorism

CDCs response: Bioterrorism

- Preparedness Planning and Readiness Assessment *
- Surveillance and Epidemiology Capacity *
- Laboratory Capacity- biologic agents
- Laboratory Capacity- chemical agents
- Health Alert Network / Training *

* *Current MONTANA grants*

CDC's response: Emerging Disease

- Enhanced surveillance and outbreak response
- Renewed support of basic and applied research
- Strengthen public health infrastructure
- Training and information programs

CDC perspective

- “The threat of bioterrorism focuses attention on overall preparedness to address the challenges posed by emerging diseases.”
- “Bioterrorism scenarios illustrate the diversity of disciplines and perspectives required to confront these threats.”
- “The need to strengthen existing and develop new partnerships is clear”

JAMES M. HUGHES, CDC

Preparedness challenges in Montana

- Rural Intermountain West state
- “Bare bones” infrastructure
- Few players
- Inadequate funding for expanding imperatives

Preparedness strengths in Montana

- Self-help culture
- Biggest town in the U.S.
- Few players
- Innovation and cooperation between disciplines

Dual Use

- Gallatin County Community/Public Health Alliance
Turning Point Initiative
- “Create a public health infrastructure that incorporates both traditional and nontraditional partners based on a culture of cooperation.”
- “Create a more integrated public health system that encourages collaboration and coordination of community and state public health resources.”

The Montana Plan

- Interagency communication & cooperation
- Interdisciplinary communication & cooperation
- Regional communication & cooperation
- Nontraditional partnerships
- Dual-use activities

Building trust

- First Responders
 - Police
 - Fire Department
 - Disaster and Emergency Services (DES)
 - HAZMAT units
- “Greater Public Health Community”
- FBI and FEMA
- CDC and EPA

Review of Grant Proposal

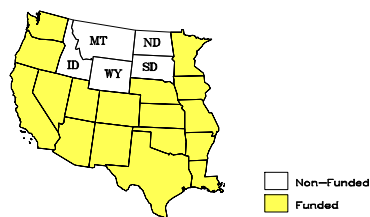
Focus Area 2: Surveillance and
Epidemiologic Capacity

(EARLY DETECTION)

Proposal highlights....

- Regional reporting

**Distribution of Nunn-Lugar-Domenici Funds
Among States in the Western U.S.**



Proposal highlights....

- Regional reporting
- Syndromic surveillance

Proposal highlights....

- Regional reporting
- Syndromic surveillance
- Animal disease integration

Proposal highlights....

- Regional reporting
- Syndromic surveillance
- Animal disease integration
- Unconventional sources of information

Overview of Proposed Activities

***Regional Surveillance for Unusual Incidents of
Unexplained Illness and Death in Humans and Animals**

1. Develop a multimedia presentation
addressing the threat of bioterrorism
in frontier America

Deliver to groups who 'need to know'

2. Establish a network of information providers

Include new & unconventional
sources of disease surveillance data

3. Set up a region-wide, toll-free, 24-hour,
incident report phone line

To report unusual incidents of
unexplained illness or death

1-800-DISEASE

4. Organize a workforce of human & animal health officials from participating states in the region

To be responsible for monitoring and reviewing incident reports

5. Create an e-mail group listserve

To facilitate communication among workforce members

6. Establish capacity for on-demand,
multi-party telephone conferencing

To enable each state to rapidly
connect with colleagues in 'real time'

7. Establish a secure, restricted-access
internet web site

To safely exchange information
among workforce members

8. Create a database containing a record of incident reports, critical information & followup findings

To be placed on web site for data entry, retrieval and analysis by workforce members

9. Program evaluation

Determine extent to which activities strengthen surveillance and epidemiologic capacity in the region

An interesting story

- The crows are dying!
- Horses in the region have neurological signs and are dying
- CNS disease in humans

New York: September 1999

- 56 cases of acute neurologic disease, 7 dead
- **St. Louis Encephalitis** virus tentatively identified
- The diagnosis came from the veterinary community: *West Nile Virus*

Lessons Learned

- Importance of integrated veterinary-human health surveillance and reporting
- Importance of disease investigation of wild as well as domestic animal outbreaks
- Importance of nontraditional sources of information
- Role of sentinel animals
- Source of the outbreak?
 - Role of the law enforcement community

Where do we go from here?

Filling in the gaps

Carcass disposal

- Q: What do you do with 40 tons of contaminated carcasses?

Disinfection / Decontamination

- Animal / human decontamination issues
- Area / carcass decontamination
- Agent specific protocols
 - Detergents
 - Oxidizing agents (Chlorine, Iodine, KMnO_4)
 - Alkali
 - Acids
 - Aldehydes
- ANTHRAX Protocol?

...diagnostic challenges

- Inadequate technology
- Inadequate bioprotection
 - Most laboratories operate on best behavior at BL2
 - Most BWAs are BL3 agents
- Inertia

#1 laboratory infection?

Laboratory support today

- LOCAL
 - Dated diagnostic technology
 - Inadequate facilities
 - Of 3 state-supported laboratories, only the MVDL routinely sees BT agents
- FEDERAL
 - Currently, all threat samples are forwarded to USAMRIID
 - Start-up BL3 lab in Logan, Utah (EPA)

Laboratory vision

- Identify and coordinate scientific resources
 - MVDL
 - DPHHS laboratory
 - State Crime Lab
 - VMB and Biofilm
 - High-Tech industry
- Facility sharing
- Expertise sharing
- Integrated, innovative training and funding

Laboratory vision

- R&D
 - Advanced diagnostics
 - Therapeutics
 - Vaccines
- User defined research focus
- Transfer of research technology to diagnostic application

Laboratory vision

- Laboratory Response Network for Biological Terrorism (LRNB)
 - BL3 facility requirement
 - Training
 - Reagents
 - Select Agent receipt
- Comprehensive preparedness through cooperation

Veterinary Contributions

- Recognize the threats of emerging disease and bioterrorism
- Be aware of the ongoing surveillance initiative
- Maintain awareness and early suspicion
 - *THESIS*: Professionals in their field of expertise “know” when something is abnormal or different
- Expand role in health community
- Report unusual incidence of disease

Veterinary Contributions

- Maintain and expand nontraditional information sources
 - Agricultural community
 - MSU Extension Agents
 - FW&P wardens and biologists
 - Humane societies
 - Pharmaceutical representatives
 - Others?

Veterinary Contributions

- Critically evaluate the program
- Contribute to program development
- Contribute to program modification
- Get a representative to the State planning table

Regional APHIS Contributions

- Integrate with ND, SD, and ID counterparts
- Train-up on the issues and plan
- Contribute to informational campaign
- Contribute to program development and execution phases
- Contribute to evaluation and modification
- Get a representative to the State planning table
- Shape USDA's support plans

Regional APHIS Contributions

- Maintain and enhance communication with other Taskforce players
- Full participation in data input and disease investigation and monitoring activities
- Liaison with FSIS counterparts
- Create a model preparedness approach to shape USDA interest, support, and funding (??)

...a word on panic

- “Any situation, no matter how insignificant, can give rise to public panic through sufficient mismanagement.”

Speaker Biographical Information

William Inskeep II, COL, VC, USA
Chairman, Department of Veterinary Pathology
Armed Forces Institute of Pathology (AFIP)
DoD Veterinary Liaison Officer to USDA

COL Inskeep is a graduate of the College of Veterinary Medicine and Biomedical Sciences at Colorado State University, Fort Collins, CO, and is a diplomate of the American College of Veterinary Pathologists. His military career began with 5 years of U.S. Air Force service as a Minuteman missile launch control officer at F.E. Warren Air Force Base, WY. He served as the installation veterinarian at Yokosuka Navy Base, Japan, and Carlisle Barracks, PA..

COL Inskeep completed the 3-year postdoctoral residency in veterinary pathology at the AFIP from 1986 to 1989, and obtained board certification in 1989. He served as Chief, Comparative Pathology Department, at Walter Reed Army Institute of Research (WRAIR) from 1989 to 1992. His next assignment was Chief, Animal Medicine Office of the Army Surgeon General, from 1992 to 1995. In 1995, he returned to the AFIP and became Chair, Department of Veterinary Pathology in 1996. In July 1998, he was appointed Army Deputy Director of the AFIP.

Paula Cowen, DVM
Staff Veterinarian
USDA, APHIS, VS

Dr. Cowen grew up primarily in Colorado. She attended California State Polytechnic University in Pomona, CA for 3 years. She returned to Colorado to complete her undergraduate studies and attend veterinary school. She graduated from the College of Veterinary Medicine and Biomedical Sciences at Colorado State University, Fort Collins, CO. in 1985. Upon graduation, she and her veterinarian husband bought a rural mixed practice in northeastern Colorado, where she worked for 10 years.

Paula has worked for APHIS as a Veterinary Educational Specialist since February 1995 with Organizational and Professional Development (OPD) at the Centers for Epidemiology and Animal health (CEAH) in Fort Collins. This has been a wonderful and exciting opportunity for her. Paula lives on a farm east of Fort Collins with her husband, John Belfrage, DVM and an Epidemiologist at CEAH, and three sons.

Tracey S. McNamara, D.V.M., Diplomate A.C.V.P.
Head, Department of Pathology at the Wildlife Conservation Society (WCS)

After graduating from the New York State College of Veterinary Medicine at Cornell University, she completed a joint residency program in Comparative Veterinary Anatomic Pathology at the Animal Medical Center and WCS. She then remained at the zoo, where she now holds the Schiff Family Distinguished Scientist in Wild Animal Pathology endowed chair. She is a member of the American College of Veterinary Pathology and Vice President of the Charles Louis Davis, D.V.M. Foundation for the Advancement of Veterinary and Comparative Pathology in addition to being the head of its zoo and wildlife pathology program. Dr. McNamara also holds the title of visiting Assistant Professor of Pathology at Albert Einstein College of Medicine of Yeshiva University. The Department of Pathology at WCS is one of only six such departments in zoological institutions in the U.S.A.

Sherrilyn Wainwright, DVM
Staff Epidemiology Officer
USDA, APHIS, VS

Dr. Sherri Wainwright is a Staff Epidemiology Officer, USDA/APHIS/VS - Emergency Programs, Foreign Animal Disease Diagnostic Laboratory, Plum Island, New York. Area Epidemiology Officer for USDA/APHIS/Veterinary Services in Albuquerque, NM, 1998-2000. Held the position of Medical Epidemiologist at the Centers for Disease Control and Prevention (CDC) in Atlanta, GA from 1996-1998, in the Epidemiology and Surveillance Division of the National Immunization Program for Adult Vaccine Preventable Diseases. She helped develop a course in Environmental and Occupational Health Epidemiology in Mexico and taught classes of "Epidemiology using the Laboratory" in Bogota, Colombia with the respective Foreign Epidemiology Training Programs (FETP) in each country.

From 1993-1995 she was an Epidemic Intelligence Service Officer at the CDC, National Center for Environmental Health in Atlanta, GA. From 1992-1993 she was a Staff Veterinarian at the *Salmonella enteritidis* Control Program of USDA/APHIS/VS in Hyattsville, Maryland, and also participated as a member of the USDA/APHIS team to develop strategic planning for Preharvest Food Safety initiative. She was an Association of Schools of Public Health Intern and worked at the CDC Division of Vector-Borne Infectious Diseases, Bacterial Zoonoses Branch in Fort Collins, CO from June-Sept 1992. She received an MPH in Epidemiology from Johns Hopkins School of Hygiene and Public Health in 1992. She was the Designated Veterinary Epidemiologist for USDA/APHIS/VS in Jackson, MS from 1989-1991 and a Veterinary Medical Officer for USDA/APHIS/VS in Oxford, MS from 1988-1989. From 1987-1988, she was a VMO in the Public Veterinary Practice Careers Training Program assigned to Wellington, KS. In 1987, Relief Veterinarian in Laredo, TX. DVM from Texas A&M University in College Station, TX in 1987 and Master of Agriculture in Animal Nutrition in 1979. BS in Animal Science from University of Connecticut at Storrs, CT in 1978.

Barry J. Meade, DVM, MS
Area Epidemiology Officer
USDA, APHIS, VS

Dr. Meade is a native of Kentucky having completed his undergraduate studies in Biology and Chemistry at Eastern Kentucky University in 1978. Upon completion of his BS degree and prior to beginning graduate studies, he worked as a research associate with the beef cattle production unit at the University of Kentucky Coldstream Research Farm in Lexington, Kentucky. In 1983, he completed a Masters of Science in Population Genetics at Louisiana State University (LSU) with the D.V.M. degree being conferred from the LSU School of Veterinary Medicine in 1986. From 1989 to 1992, Dr. Meade has worked as a regulatory veterinarian for the United States Department of Agriculture (USDA) in Arkansas conducting on farm surveillance and epidemiological investigations of selected animal disease conditions. In 1992, he was selected as the USDA participant to the Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) training program. After completion of the EIS training, he was a Regional Epidemiologist for USDA in Tampa, Florida. Currently, he is assigned to the USDA, Veterinary Service Area Office in Frankfort, Kentucky where he has primary responsibility to provide technical oversight for investigations and surveillance of communicable diseases of animals involved in production agriculture. Dr. Meade serves as a designated epidemiologist for the USDA, Early Response Team (ERT); a select group of Foreign Animal Disease Diagnosticians (FADD) who are deployed to investigate unusual conditions or emerging disease conditions of economic importance.

Major Thomas Larsen
Chief, Experimental Pathology
United States Army Medical Research Institute of Infectious Diseases

Major Larsen graduated from Iowa State University's College of Veterinary Medicine in 1988 and received diplomate status in the American College of Veterinary Pathologists in 1995. After graduation and before entering the U.S. Army, Major Larsen was an associate veterinarian in a mixed animal practice in Macomb, Illinois. Major Larsen has held a variety of assignments as a U.S. Army Veterinary Corps officer including principle investigator at the United States Army Medical Research Institute of Chemical Defense, veterinary pathology resident and Chief of Necropsy at Walter Reed Army Institute of Research, graduate student at Johns Hopkins University, and Chief of Experimental Pathology at the United States Medical Research Institute of Infectious Diseases. During these tours, Major Larsen was involved in a diverse number of projects including the development of an animal model to test antidotes for sulfur mustard, the Convulsant Antidote for Nerve Agent (CANA) project which resulted in the fielding of diazepam during the Gulf War, pathology support for protocols on *Shigella* and cholera, and the pathogenesis of alphaviruses. He has attended the Toxic Agent Training Course, the Medical Management of Chemical and Biological Casualties Course, and the Combat Casualty Care Course. Major Larsen is an author on 22 scientific publications and abstracts in a broad range of forums including behavioral, toxicological, neuroscience, infectious diseases, pathology, and military science.

**Randall L. Crom, DVM
Staff Veterinarian
USDA, APHIS, VS**

Dr. Crom is currently a staff veterinarian assigned to the Emergency Programs staff in Veterinary Services (VS) of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS). Since February 2000 he has been working as the coordinator of West Nile virus issues for APHIS-VS. From 1997 to 1999, Dr. Crom was seconded by APHIS to the Communicable Diseases Cluster of the World Health Organization in Geneva, Switzerland. While in Geneva, he worked on emerging zoonotic disease issues ranging from antimicrobial resistance related to use in food-producing animals, to an outbreak of avian influenza in birds and humans in Hong Kong. Since joining APHIS-VS in 1984, he has worked in field programs in Puerto Rico to eradicate brucellosis, tuberculosis, and cattle ticks, and as an epidemiologist with the Center for Emerging Issues of the Centers for Epidemiology and Animal Health in Fort Collins, Colorado. Dr. Crom received training and experience in epidemiology as an Epidemic Intelligence Service (EIS) Officer for the Centers for Disease Control and Prevention (CDC) from 1986 to 1988. He received his Doctor of Veterinary Medicine degree in 1980 from the College of Veterinary Medicine at Iowa State University.

**David R. Franz, DVM, Ph.D.
(Colonel, U.S. Army Retired)
Vice President, Chemical and Biological Defense Division
Southern Research Institute**

David R. Franz served in the U.S. Army Medical Research and Materiel Command for 23 of his 27 years on active duty. Dr. Franz has served as both Deputy Commander and then Commander of the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) and as Deputy Commander of the U.S. Army Medical Research and Materiel Command. Prior to joining the Command, he served as Group Veterinarian for the 10th Special Forces Group (Airborne.)

Dr. Franz served as Chief Inspector on three United Nations Special Commission biological warfare inspection missions to Iraq, and as technical advisor on long-term monitoring. He also served as a member of the first two US/UK teams that visited Russia in support of the Trilateral Joint Statement on Biological Weapons, and as a member of the Trilateral Experts' Committee for biological weapons negotiations.

Dr. Franz was Technical Editor for the Textbook of Military Medicine on Chemical and Biological Defense released in 1997. His current national-level committee appointments include the Defense Intelligence Agency Red Team Bio-Chem 2020, the Defense Science Board for Biological Defense, the Defense Threat Reduction Agency/Threat Reduction Advisory Committee Science & Technology Panel and the National Academy of Sciences Committee for Research with Russian Biological Institutes.

He has been an invited speaker at nationally and internationally recognized organizations including: the American Society for Microbiology, the National Academy of Sciences, Georgetown University, the Brookings Institution, the FBI Academy, the U.S. Army War College, the Naval War College, the Air War College, the National Defense University and the

U.S. Military Academy at West Point. He currently serves on the faculty of the Department of Justice, Center for Domestic Preparedness.

He is a resident graduate of the Army Command and General Staff College, a recipient of the Army Research and Development Achievement Award, the Order of Military Medical Merit and the Legion of Merit with oak leaf cluster.

Dr. Franz, who resides with his wife, Pat, in Frederick, Maryland, holds a D.V.M. from Kansas State University and a Ph.D. in Physiology from Baylor College of Medicine.

**Robin K. Koons, Ph.D.,
Occupational/Environmental Epidemiologist
Independent Consultant**

Ph.D. in Occupational and Environmental Epidemiology. Colorado State University.

Over 15 years of experience analyzing, developing, and implementing programs related to disease/injury prevention and control. Technical expertise in advanced epidemiological and analytical evaluations, formal communication, strategic planning, and contingency plan development, with a focus in developing and implementing administrative and technical aspects of program management. Creator of efficient and effective databases for investigative findings, documenting compliance, and monitoring trends. Analysis of occupational exposures, hazardous materials, and biomedical equipment in health care settings. Development of strategic plans for mass casualty medical response for a level 1 trauma center and contingency plan development for public health situations as well as internal areas of vulnerability to organizations.

Currently an Assistant Professor (Environmental Health Program Management) for the Department of Environmental Health, Colorado State University; Adjunct Faculty in Epidemiology for University College, University of Denver; the Manager of Environmental Health and Safety for The Children's Hospital of Denver; and an independent consultant to public health agencies and private organizations in risk assessment, policy development, and program management improvement. Previously an instructor of Applied Epidemiology for public health professionals through the Centers for Disease Control and Prevention, and an instructor of Communicable Disease Investigations and Risk Communication for the Food and Drug Administration, Washington, DC Training Branch. Past experience as a Senior Epidemiologist for 10 years for a large district health department in Colorado.

Captain Hugh Bailey
Environmental Science Officer
First Special Forces Group

CPT Bailey is the Environmental Science Officer for the 1st Special Forces Group (Airborne), located at Fort Lewis, Washington. As such, he is responsible for all public health and preventive medicine aspects of 1st SFG(A) operations while deployed abroad in the Pacific theater of operations. His past assignments include Environmental Engineer, United States Army Center for Health Promotion and Preventive Medicine, Direct Support Activity-North, Environmental Science Officer, 2nd Infantry Division-Korea, and Heavy Equipment Operator, 52nd Engineer Battalion, Fort Carson. CPT Bailey has participated in Biosecurity operations for redeploying forces in Saudi Arabia after operation Desert Storm, and in South Korea during Foal Eagle 96 and 99. He holds a Bachelor of Science Degree in Civil Engineering.

Captain Todd M. Thomas
Commander, 94th Medical Detachment (VM)

CPT Todd M. Thomas is from Somerville, Alabama. He graduated with a Bachelor's Degree in Animal and Dairy Sciences from Auburn University in 1992. At the same time, he was commissioned from the Army ROTC program and began an educational delay for veterinary school. He received his Doctor of Veterinary Medicine in 1995 from the Auburn University College of Veterinary Medicine. After graduating, CPT Thomas completed a one-year rotating internship in small animal medicine and surgery at the Animal Medical Center in New York City. He entered active duty in August 1996.

CPT Thomas completed the AMEDD Officer Basic Course in 1996, and the AMEDD Officer Advanced Course in 1999. He completed the Foreign Animal Disease Diagnosticians Course in March 2000. His last assignment was Chief of the Animal Medicine Branch, Panama District Veterinary Command from Dec 1996-Aug 1999. CPT Thomas is currently the Commander of the 94th Medical Detachment (Veterinary Medicine) at Ft. Sam Houston, Texas. He is also Chairman of the Veterinary Corps Junior Officer Council. He has earned the Army Achievement Medal, Meritorious Service Medal, and the Overseas Service Ribbon.

David L. Huxsoll, DVM, Ph.D.
Chief, Plum Island Animal Disease Center
USDA, ARS

Dr. David L. Huxsoll, Chief, Plum Island Animal Disease Center, is a native of Indiana. After completing paraprofessional studies at Purdue University, he entered the University of Illinois where he received his D.V.M. Degree in 1961. Following a brief practice experience in northern Illinois, Dr. Huxsoll entered the Army with an initial assignment at the Walter Reed Army Institute of Research. In 1962, Dr. Huxsoll entered the University of Notre Dame and received his Ph.D in 1965. Much of Dr. Huxsoll's professional career has been spent in research on infectious diseases. In 1969, he identified Ehrlichia canis as the cause of highly fatal hemorrhagic disease of military working dogs in Southeast Asia.

Dr. Huxsoll held various assignments at the Walter Reed Army Institute of Research including Chief, Department of Veterinary Diagnostic Services, and Deputy Director, Division of Veterinary Medicine. In 1967 and 1968 Dr. Huxsoll was Chief, Department of Veterinary Medicine, 9th U.S. Army Medical Laboratory, Vietnam. From 1974-1979 he served as Commander of the U.S. Army Medical Research Unit in Kuala Lumpur, Malaysia where the research focused on diseases of military importance in equatorial Asia. In 1983, following a 4 year assignment as a Research Director in the Headquarters. U.S. Army Medical Research and Development Command, Dr. Huxsoll became the first veterinarian to command the U.S. Army Medical Research Institute of Infectious Diseases. He held that position until June 1990 when he retired from the Army to join the faculty in the School of Veterinary Medicine, Louisiana State University as Associate Dean for Research and Advanced Studies. He became Interim Dean in 1993 and in 1995 was appointed Dean, a position he held until April 1999, when he resigned to pursue other interests including teaching and research within the School of Veterinary Medicine.

Dr. Huxsoll was selected as a member of the first United Nations Special Commission Biological Inspection Team sent to Iraq in Summer, 1991, following "Desert Storm," and served as head of a 13 member United Nations Special Commission Team sent to Iraq in September 1991 for 2 weeks to inspect sites in Iraq suspected of biological weapons programs. In September 1994 Dr. Huxsoll again served as Chief Inspector for a United Nations inspection team to Iraq.

Dr. Huxsoll and his wife, Beverly, have two children, Leslie Ann and David.

Marc E. Mattix, DVM
Diplomate, American College of Veterinary Pathologists

Dr. Mattix received his Doctor of Veterinary Medicine from Washington State University in 1983, and completed a residency in Comparative Pathology at the Walter Reed Army Institute of Research. He served as Chief of Laboratory Services, Walter Reed Army Institute of Research, and Chief of Diagnostic Services at the Armed Forces Institute of Pathology until his return to Montana in 1994.

Dr. Mattix is currently a pathologist with the Montana State Diagnostic Laboratory in Bozeman, Montana, and a Lieutenant Colonel with the 7229th Medical Support Unit at Fort Lewis, Washington.

He is cosponsor of a CDC grant integrating animal and public health surveillance and is an active participant in terrorism preparedness planning at the state level

Dr. Mattix is a 1975 graduate of Great Falls High School.

Washington State University (1979): Degrees in Zoology and Veterinary Science

Washington State University (1983): Doctor of Veterinary Medicine

Residency in Comparative Pathology (1988-92): Walter Reed Army Institute of Research (WRAIR) and the Armed Forces Institute of Pathology (AFIP)

Board Certification: 1992

Positions: Chief of Laboratory Services, WRAIR

Chief of Diagnostic Services, AFIP

Returned to Montana in 1994 as a pathologist with the Montana Veterinary Diagnostic Laboratory in Bozeman

Recognition!!

We wish to thank the following individuals for contributions to this Seminar.

LTC Jim Elliot, DoD -

Proceedings Publication

Ms. Dawn Ragione, USDA -

Cover Design

Ms. Stormy Jones, USDA -

Web Design

Ms. Melanie Adams, USDA -

Technical Support